

REMARKS:

- 1) Referring to item 12) of the Office Action Summary, please acknowledge the foreign priority claim and receipt of the certified copy of the Priority Document, which was filed together with this application on November 13, 2003.
- 2) Referring to item 10) of the Office Action Summary, please accept and approve the formal drawings originally filed with this application on November 13, 2003.
- 3) The claims have been amended as follows.

Independent claim 1 has been amended to make clear that step b) involving the continuous pretreatment process is carried out so that the material web with the repeating pattern of fold lines formed therein still has the flat planar configuration. This feature is supported in the original disclosure especially at page 16, lines 17 to 26; lines 8 to 9 of original claim 13; Fig. 1 of the drawings; and also in the specification at page 5, lines 12 to 16; page 7, lines 1 to 12; and page 15, lines 19 to 24. Thus, this clarification does not introduce any new matter. As it is not necessary that the pretreatment process takes place from both the upper surface and the lower surface, claim 1 has also been amended to make clear that this process proceeds from at least one of the upper surface and the lower surface. The feature that both the upper and lower surfaces are involved has instead been introduced in new claim 25.

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Claim 14 has been amended in a manner generally analogous to claim 1. Namely, amended claim 14 now expressly recites that the first arrangement for pre-treating the material web is particularly adapted to form fold lines in the material web while maintaining an initial flat planar configuration of the material web. As mentioned above, this is supported in the original disclosure at page 16, lines 17 to 26; claim 13, lines 8 to 9; Fig. 1 of the drawings; and additional portions of the specification mentioned above. Also, claim 14 has been broadened to recite that the first arrangement is adapted to pre-treat the material web from at least one of the upper surface and the lower surface, while the feature regarding the arrangement at both the upper and lower surfaces has been introduced in new claim 28.

New dependent claims 25 to 28 have been submitted. Claim 25 is supported by a feature taken from original claim 1. Claim 26 is supported by the drawing figures and the specification at page 5, line 6. Claim 27 is supported by the drawing figures and the specification at page 5, lines 5 to 9 and 26 to 27. Claim 28 is supported by a feature taken from original claim 14.

In view of the above mentioned supporting original disclosure, the claim amendments and the new claims do not introduce any new matter. Entry and consideration thereof are respectfully requested.

- 4) Referring to section 2 on pages 2 to 3 of the Office Action, the rejection of claims 1 to 6, 8, 12 to 18, 21, 23 and 24 as obvious over US Patent 4,012,932 (Gewiss) is respectfully traversed.

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This rejection will be discussed separately in connection with each of the rejected independent claims 1, 13 and 14.

- 5) Present amended independent claim 1 makes a special feature of the invention more clear.

Namely, in amended claim 1, the step b) of subjecting the material web to a continuous pre-treatment process to form a repeating pattern of fold lines in the material web is carried out such that the material web with the repeating pattern of fold lines still has the flat planar configuration of the initial or starting material web. In this regard, see the specification at page 16, lines 17 to 26; claim 13, lines 8 to 9; and Fig. 1. In Fig. 1 it can be seen that the material web (M2) having the repeating pattern of fold lines has exited from both sets of rolls (1 and 2; 3 and 4), while still having a flat planar configuration.

This is a significant difference between the invention and the prior art. Namely, this feature makes a clear distinction between an initial pre-treatment process and a subsequent fold initiation and fold formation process. The initial step of a continuous pre-treatment process merely forms a repeating pattern of lines in the material web while the material web still has the flat planar configuration. Thereafter, in separate steps, the material web is deformed out of its flat planar configuration into a three-dimensionally folded configuration in a step c) of initiating the formation of folds, and a step d) of carrying out and completing the formation of folds.

It is advantageous, according to the invention, to form a repeating pattern of fold lines in the material web while it still has its flat planar configuration, because this pattern of fold lines can develop a self-folding tendency of the material web, before actually carrying out any folding deformation of the material web. Namely, the formation of a repeating pattern of fold lines in the initial flat planar material web introduces self-tensions in a pre-defined pattern, so that the material web develops an automatic kinematics so that the web "wants to" fold in a particular pattern. Thereafter, when the folding deformation is initiated and then completed in separate subsequent steps, the folds can be carried out very precisely and very effortlessly.

On the other hand, all of the known prior art, including Gewiss, involves immediately forming folds by deforming the material web out of a flat planar configuration in a particular fold pattern. In other words, the prior art does not involve a previous step of merely forming a pattern of lines in the material web still having its flat planar configuration, followed by a later step of initiating folds along the fold lines. Instead, folds are "forced" into the material web immediately from its flat planar configuration into a three-dimensionally deformed configuration.

- 6) As pointed out by the Examiner, Gewiss discloses a process in which the very first step of treating a material web involves pre-pleating the material web by folding or pleating the web along longitudinally extending fold valleys and peaks.

In this regard, see the Gewiss reference at col. 3, lines 42 to 47; col. 4, lines 14 to 22; and Fig. 2.

The cited portions of the description clearly and expressly explain that

"the initially flat sheet, ... 1, is first folded along longitudinal fold lines 2 which alternate transversely to provide an area or portion 3 of small longitudinal folds corresponding to longitudinal folds of the structure to be formed. The longitudinally folded sheet 3 is then folded transversely...." (underlining added, col. 3, lines 42 to 47).

Also, Fig. 2 clearly shows that the flat sheet or material web (1) coming from the supply roll (13) initially has a flat planar configuration (represented by a thin single black line), while the material web after passing through the initial pleating rollers (9, 10) has a vertical thickness (represented by two thin black lines spaced apart from each other) at reference number 3, due to its folded condition, no longer corresponding to the initial flat planar configuration at reference number 1.

Thus, the method according to Gewiss immediately forces the flat planar material web into a folded condition, rather than first forming a pattern of lines in the flat material web and only thereafter initiating folds along the lines as taught by the present invention.

This significant distinction between the prior art and the present invention would not have been obvious, because Gewiss expressly teaches away from the present invention (as discussed above), and would not have provided any suggestions, motivations

or hints of any kind toward proceeding according to the distinct steps b), c) and d) of present independent claim 1.

- 7) Present independent claim 13 is directed to a method of producing a folded structure with several significant features distinguishing the invention over the prior art.

Step b) of claim 13 involves forming a repeating pattern of fold lines in a material web with "said material web still having said flat planar configuration". As discussed above in connection with claim 1, this feature of the invention is directly contrary to the express teachings of Gewiss, whereby the flat planar material web is immediately forced into a folded configuration in the very first treatment step, rather than first merely forming a pattern of lines while maintaining the flat planar configuration as according to the invention.

Step c) of present claim 13 recites initiating a formation of folds along at least some of the fold lines by directing jets of a fluid at the material web. The Examiner has not addressed this feature of claim 13, and it is neither disclosed nor suggested by Gewiss. To the contrary, Gewiss uses mechanical rollers that immediately mechanically impress pleats or folds into the material web from its flat planar condition into a folded condition. There would have been no suggestion toward using jets of a fluid directed at the material web in order to initiate the formation of folds along previously formed fold lines. In fact, there would have been no suggestion toward a separate step of initiating folds along fold lines in this manner

using fluid jets, because Gewiss would not have suggested such a previous formation of fold lines in the first place.

Step d) of present claim 13 recites a process of further forming the folds in the material web by passing the material web between intermeshing bristle brush rolls. The Examiner has acknowledged that Gewiss does not disclose bristle brush rolls to complete the folding, but has asserted that it is well known in the art to use brush means as claimed. In this regard, since Gewiss expressly uses hard pleating rollers to directly form pleat-folds into a material web, it is submitted that a person of ordinary skill in the art would have seen no purpose and no benefit toward additionally using bristle brush rolls to complete folds that had previously been initiated, because Gewiss does not provide such successive steps of initiating folds and then completing folds using different tools. If the Examiner believes that there is pertinent prior art in this regard, the Examiner is respectfully requested to cite such prior art.

- 8) Present independent claim 14 is directed to an apparatus including several sub-arrangements for processing a material web to form a folded core structure.

The apparatus includes a first arrangement adapted to form fold lines in the material web while maintaining an initial flat planar configuration of the material web. As discussed above analogously in connection with claims 1 and 13, the express teachings of Gewiss are directly contrary to the presently claimed apparatus. Namely, the apparatus according to Gewiss does not include any component or arrangement that is adapted to

form fold lines in a flat planar material web while maintaining the initial flat planar configuration thereof. To the contrary, the very first processing arrangement of the apparatus according to Gewiss, involving the pleating rollers (9, 10), immediately folds or pleats the material web out of its initial flat planar configuration into a longitudinally folded configuration.

A person of ordinary skill in the art would have found no suggestions toward the significantly different apparatus according to the invention, with a first arrangement adapted to form fold lines while maintaining the initial flat planar configuration of the material web, followed by second and third arrangements respectively adapted to initiate and proceed with forming folds along the previously formed lines.

Gewiss would not even have suggested how such an apparatus could have been achieved.

- 9) For the above reasons, present independent claims 1, 13 and 14 and the dependent claims thereof would not have been obvious over the prior art, and the Examiner is respectfully requested to withdraw the rejection of claims 1 to 6, 8, 12 to 18, 21, 23 and 24 as obvious over Gewiss.
- 10) Referring to section 3 on page 3 of the Office Action, the rejection of claims 7, 9 to 11, 19, 20 and 22 as obvious over Gewiss in view of US Patent 6,136,417 (Ishibuchi et al.) is respectfully traversed.

Claims 7 and 9 to 11 depend from independent claim 1, and claims 19, 20 and 22 depend from independent claim 14. The



patentability of the independent claims has been discussed above in comparison to Gewiss.

The Examiner has further referred to Ishibuchi et al. to "show heating means as well as fluid nozzle means" in combination with Gewiss. However, even such additional features would not have made the significant aspects of the independent claims obvious, because they do not relate to those aspects of the independent claims as discussed above.

Moreover, these features of the prior art would not have suggested the distinct aspects of the invention, because they are not disclosed in the same context. For example, present claim 10 recites that initiating the formation of folds comprises directing a flow of fluid at a surface of the material web. On the other hand, Ishibuchi et al. disclose fluid spray nozzles (6s, 6r) only used to moisten the fiberboard sheet. Namely, the disclosed nozzles are not suggested as performing or having any relevance to the presently claimed method step of initiating the formation of folds along fold lines by directing a flow of fluid at a surface of the material web.

Such a method step also would not have inherently resulted from the fluid spray nozzles according to Ishibuchi et al., because in order to initiate folds along fold lines, the nozzles would have to be particularly positioned appropriately relative to the fold lines, which is neither disclosed nor suggested by Ishibuchi et al. Instead, the nozzles of Ishibuchi et al. are distributed over the area of the sheet, simply to spray water on the sheet surface so as to moisturize the overall sheet (col. 11, lines 1 to 67). Thus, even using such general moisturizing units

according to Ishibuchi et al. in the method according to Gewiss would not have suggested or inherently resulted in the presently claimed step of initiating folds along fold lines by directing a flow of fluid at a surface of the web.

Similar considerations apply to present independent claim 13, which also involves directing jets of a fluid at the material web.

For the above reasons, the Examiner is respectfully requested to withdraw the rejection of claims 7, 9 to 11, 19, 20 and 22 as obvious over Gewiss in view of Ishibuchi et al.

- 11) The additional prior art made of record requires no particular comments because it has not been applied against the claims.
- 12) The new dependent claims recite additional features that further distinguish the invention over the prior art. The Examiner is respectfully requested to consider these features in comparison to the references. For example, compared to present claims 26 and 27, the method of Gewiss does not include or suggest an initial step of forming fold lines that intersect one another in star patterns and form a continuous field of surface areas that are bordered and enclosed by the fold lines and that border one another along the fold lines. To the contrary, the very first step according to Gewiss merely forms parallel longitudinal pleat-folds.

- 13) Favorable reconsideration and allowance of the application, including all present claims 1 to 28, are respectfully requested.

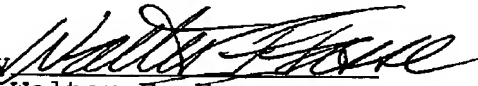
Respectfully submitted,

Rainer KEHRLE

Applicant

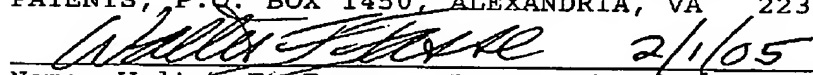
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